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method steps can be performed by a programmable processor executing a program of instructions to perform functions of the described implementations by operating on input data and generating output. The described features can be implemented advantageously in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. A computer program is a set of instructions that can be used, directly or indirectly, in a computer to perform a certain activity or bring about a certain result. A computer program can be written in any form of programming language, including compiled or interpreted languages, and it can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, or other unit suitable for use in a computing environment.

Suitable processors for the execution of a program of instructions include, by way of example, both general and special purpose microprocessors, and the sole processor or one of multiple processors of any kind of computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The elements of a computer may include a processor for executing instructions and one or more memories for storing instructions and data. Generally, a computer will also include, or be operatively coupled to communicate with, one or more mass storage devices for storing data files; such devices include magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and optical disks. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

To provide for interaction with a user, the features can be implemented on a computer having a display device such as a CRT (cathode ray tube) or LCD (liquid crystal display) monitor for displaying information to the user and a touchscreen and/or a keyboard and a pointing device such as a mouse or a trackball by which the user can provide input to the computer.

The features can be implemented in a computer system that includes a back-end component, such as a data server, or that includes a middleware component, such as an application server or an Internet server, or that includes a front-end component, such as a client computer having a graphical user interface or an Internet browser, or any combination of them. The components of the system can be connected by any form or medium of digital data communication such as a communication network. Examples of communication networks include, e.g., a LAN, a WAN, and the computers and networks forming the Internet.

The computer system can include clients and servers. A client and server are generally remote from each other and typically interact through a network, such as a network described above. The relationship of client and server arises by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

A number of implementations have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of

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the disclosure. Accordingly, other implementations are within the scope of the following claims.

The invention claimed is:

1. A non-transitory computer-readable medium storing instructions executable by one or more computers that, upon execution, cause the one or more computers to perform operations comprising:

storing, at a client device, a credential identifier associated with a user identifier and a location;

receiving, at the client device, a request to output a graphical representation of the credential in a manner that enables a credential authority to validate the graphical representation;

responsive to receiving the request to output the graphical representation of the credential:

obtaining, at the client device, a time measured by a timing device of the client device;

generating, at the client device, the graphical representation of the credential based on the credential identifier and the time;

outputting, to a display of the client device, the generated graphical representation in a manner that enables the credential authority to validate the credential by visual inspection of the generated graphical representation;

obtaining a location of the client device;

determining that the location of the client device is within a predefined distance of the location associated with the credential;

responsive to determining that the location of the client device is within the predefined distance of the location associated with the credential, storing, in a memory of the client device, data indicating that the user has entered the location associated with the credential.

2. The computer-readable medium of claim 1, wherein the operations further comprise transmitting, from the client device to a server, a message indicating that the user has entered the location associated with the credential.

3. The computer-readable medium of claim 1, wherein storing, at a client device, a credential associated with a user identifier and a location comprises storing, at a client device, a credential associated with a user identifier, a location, and a time;

wherein the operations further comprise:

obtaining a time at the client device responsive to receiving the request to render the representation of the credential;

determining that the time at the client device is within a predefined time period associated with the credential; and

responsive to determining that the location of the client device is within the predefined distance of the location associated with the credential and determining that the time at the client device is within the predefined amount of time of the time associated with the credential, storing data indicating that the user has entered the location associated with the credential at the time associated with the credential.

4. The computer-readable medium of claim 3, wherein the operations further comprise transmitting, from the client device to a server, a message indicating that the user has entered the location associated with the credential.

5. The computer-readable medium of claim 1,

wherein determining that the location of the client device is within a predefined distance of the location associated with the credential comprises determining that the location of the client device is within a first predefined distance of the location associated with the credential;